

CLAIMS:

Suba 17

1. A method of promoting regeneration of surface cartilage of a joint, comprising:

- covering an area of damaged cartilage of a joint to be treated with a patch comprised of a multi-layer sheet of collagen membrane material, wherein said multi-layer sheet of collagen membrane material is comprised of at least one barrier layer which acts as a barrier to inhibit passage of cells therethrough, wherein said sheet of collagen membrane material further comprises a matrix layer predominantly of collagen II having an open sponge-like texture;

- fixing the patch over said area; and
- allowing said area to regenerate cartilage.

Suba 17

2. The method of claim 1, wherein said barrier layer, said matrix layer or both, are impregnated with glycosaminoglycan.

3. The method of claim 2, wherein the glycosaminoglycan is hyaluronic acid, chondroitin 6-sulphate, keratin sulphate or dermatan sulphate.

4. The method of claim 1 wherein the patch is fixed over the area to be treated by adhesively bonding the patch to cartilage surrounding said area to be treated.

5. The method of claim 1 wherein the patch is fixed over the area to be treated by suturing the patch to cartilage surrounding said area to be treated.

6. The method of claim 1 wherein said membrane material carries at least one pharmaceutically or biologically active substance or mesenchymal stem cells having ability to differentiate into cells to regenerate cartilage or bone.

7. The method of claim 6 in which the pharmaceutically active substance is selected from the group consisting Taurolidine, Taurultam and a mixture thereof.

8. The method of claim 6 in which the pharmaceutically active substance is selected from the group consisting of cell growth-promoting hormones, bone morphogenetic proteins (BMPs), other skeletal matrix molecules, and signaling peptides.

9. The method of claim 6 wherein the pharmaceutically active substance is selected from the group consisting of BMP-2, BMP-3, BMP-4, BMP-7, BMP-8, OP-1, PTH, TGF- $\beta$ , TGF- $\beta$ 1, VEGF, CIP, IGF, PTHrP, PDGF and mixtures thereof.

10. The method of claim 1 wherein said membrane material carries articular cartilage stem cells or bone stem cells.

11. The method of claim 1 wherein said membrane material carries bone marrow stromal cells.

12. The method of claim 1 wherein said barrier layer has at least one smooth face so as to inhibit cell adhesion thereon, said barrier layer further having a fibrous face opposite said smooth face, wherein said matrix layer is adhered to said fibrous face.

13. The method of claim 1 further comprising implanting a resorbable bone mineral implant material into a region of bone injury in the area to be treated, prior to fixing said patch over said area to be treated.

14. The method of claim 13, wherein said bone mineral is charged with chondrocytes.

15. The method of claim 1, wherein said patch is charged with chondrocytes.

16. The method of claim 1 wherein said patch is comprised of a single barrier layer.

17. The method of claim 1 wherein said patch comprises said matrix layer sandwiched between one said barrier layer and a second said barrier layer.

18. The method of claim 1 wherein the matrix layer is provided by collagen II material derived from natural cartilage.

19. The method of claim 18 wherein the collagen II material is derived from hyaline cartilage from pigs.

20. The method of claim 18 wherein the collagen II material is physically cross-linked.

21. The method of claim 1 wherein said at least one barrier layer is predominately made up of collagen I, collagen III or mixtures thereof.

22. The method of claim 21 wherein said at least one barrier layer is derived from peritoneum membrane from calves or pigs.

23. The method of claim 1 wherein said patch is impregnated with a glycosaminoglycan.

24. The method of claim 23 wherein said glycosaminoglycan is hyaluronic acid, chondroitin 6-sulphate, carotin sulphate or dermatan sulphate.